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Welch Allyn®

AudioPath EOAE Screener

29230

User Manual

Title: AudioPath EOAE Screener User Manual

Date: <August 1999>

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IMPORTANT: Please complete and mail to register instrument for warranty.

REGISTRATION CARD

Instrument Model Purchase Date_____

AudioPath Screener Serial # _____

Printer/Charger Module Serial # _____

Purchaser's Company _____

User's Name _____ Title _____

Department _____ Telephone _____Ext _____

Address _____

City _____ State _____ Zip _____

How did you learn about the instrument?

Sales Representative	☐	Advertisement	☐
Exhibit	☐	Consultant	☐
Another User	☐	Other	☐

	Yes	No
Did your instrument arrive in satisfactory condition?	☐	☐
Did your instrument function properly?	☐	☐
Is the instruction manual satisfactory?	☐	☐
Any questions regarding operation of this unit?	☐	☐

If questions, specifically how can we help you? _____

_____

What features most influenced your buying decision _____

_____

What features have proven most helpful with usage? _____

_____

Do you have suggestions for future Welch Allyn instrumentation?_____

_____

What medical/safety journals do you read? _____

_____

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Introduction 1

Thank you for purchasing the Welch Allyn AudioPath Screener.

The AudioPath Screener provides a quick, reliable way to screen for cochlear function, particularly among patients from birth to age four or five. This promotes earlier diagnostic testing and earlier intervention for those with cochlear hearing loss. The Screener:

- Quickly evaluates cochlear function
- Displays results as they happen
- Stores data from two ears before printing
- Prints out hardcopy on demand

The Printer/Charger Module (PCM) prints data stored in the AudioPath Screener and charges the rechargeable battery in the AudioPath Screener.

This manual describes how to operate and maintain the AudioPath Screener and Printer/Charger. Please follow these instructions to ensure many years of accurate and reliable service.

For additional information on the technology used in the AudioPath Screener, see the *Guide to Otoacoustic Emissions* on page 57.

Product Information

For future reference, record the Screener's serial number here. [ ]

The serial number is printed on a label on the back of the instrument, and has the following format: 1999 0914 where the first four digits are the year of manufacture and the next digits are a unique product number assigned by the factory.

About This Manual

This manual assumes a certain level of medical knowledge, particularly how to perform tests on infants and small children. In addition, we assume that you have used other medical screening devices and are familiar with a graphical interface and using buttons to select different options.

Conventions

Throughout this manual, the following typeface: EXAMPLE OF MESSAGE indicates the following items:

- Messages that appear on the Screener LCD display
- Names of buttons and LEDs on the Screener and the Printer/Charger

Messages that appear on the printouts from the Printer/Charger appear in `Courier`.

This manual also uses icons and symbols, described below.

Provides important related information, reminders, recommendations, and suggestions.

Indicates patient safety alerts. Also indicates that a specific action could cause harm to your instrument or result in lost data.

Indicates an electrical danger to you or a patient. Follow the guidelines in the manual or on the instrument itself when handling electrical equipment.

Product Symbols

The symbols on the AudioPath Screener and Printer/Charger Module (PCM) are defined below.

Table 1 – Product Symbols

Symbol	Means
	Refer to User Manual.
	Disconnect from the Mains.
	Disassembly of the AudioPath Screener, Probe/Pod, or Printer/ Charger Module (PCM) beyond the extent described in this manual voids the warranty. Refer all servicing to Welch Allyn or a Welch Allyn Authorized Service Representative.
	Charge the AudioPath Screener only in the Printer/Charger Module (PCM) or with the specified Charging Transformer. Do not use either the Printer/Charger Module (PCM) or the Charging Transformer with any other instruments.
	Disassembly of the Printer/Charger Module (PCM) presents a possible electrical shock hazard. Refer all servicing to Welch Allyn or a Welch Allyn Authorized Service Representative.

Getting Started 2

Unpacking and Verifying Contents

Inspect the packaging for any damage incurred during shipping. If you find any damage, notify the carrier. Complete and return the warranty registration card. It validates the warranty and allows Welch Allyn to send announcements of product enhancements.

When you unpack your new Welch Allyn AudioPath Screener System, verify that the following items are included:

- AudioPath Screener
- User Manual (this document)
- Quick-Reference Guide
- Starter Kit, Single-Use Eartips
- Quick Check Cavity
- Cleaning Kit
- Calibration Certificate
- Videotape and Training Booklet
- Printer/Charger Module (PCM)
- Two rolls of paper (one thermal paper, one adhesive backed)
- Hospital-grade Power Cord to connect the Printer/Charger Module (PCM) to Mains outlet

If you believe any items are missing, contact your Welch Allyn representative.

Precautions

If the AudioPath Screener is not at room temperature, allow 30 minutes for it to return to operating temperature range before using.

Do not charge the battery (do not place the Screener in the Printer/Charger Module (PCM) or attach the Screener to the Charging Transformer) at temperatures greater than 113°F (50°C).

Do not store the AudioPath Screener or Printer/Charger Module (PCM) at temperatures that exceed 158°F (70°C).

AudioPath Screener Features

Use this figure to familiarize yourself with the features of the Screener, Pod, and Probe.

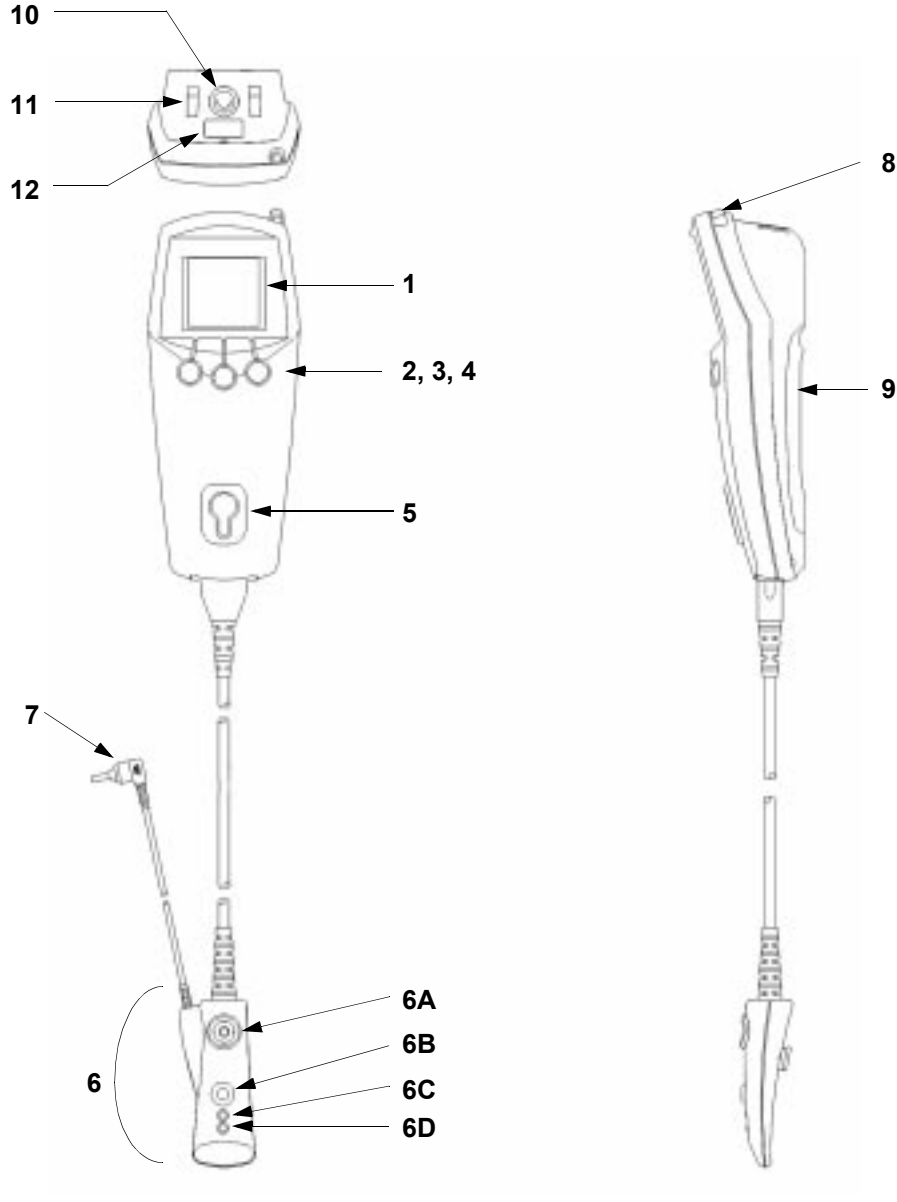


Figure 1 AudioPath Screener, Pod, and Probe Features

1 Display Screen

2 LEFT Ear memory Button (Blue)

3 TEST Button (Green)

4 Right Ear Memory Button (Pink)

5 Pod Storage Cavity

6 Pod (contains probe calibration information)

- **6A** Probe Storage Cavity
- **6B** Start/Stop Button (Green)
- **6C** Yellow LED: Poor Eartip Seal Indicator
- **6D** Green LED: Test Progress Indicator

7 Probe (shown with probe tip attached)

8 Stylus

Stylus has a pointed end. Keep stylus out of reach of infants and small children.

9 Access Door for Battery and Language Selector Switches

10 Connector for Charging Transformer and Footswitch

11 Charging Contacts for Battery

12 Infrared Port Window

Printer/Charger Module (PCM) Features

Front View

Use Figure 2 and Figure 3 to familiarize yourself with the features of the Printer/Charger Module (PCM).

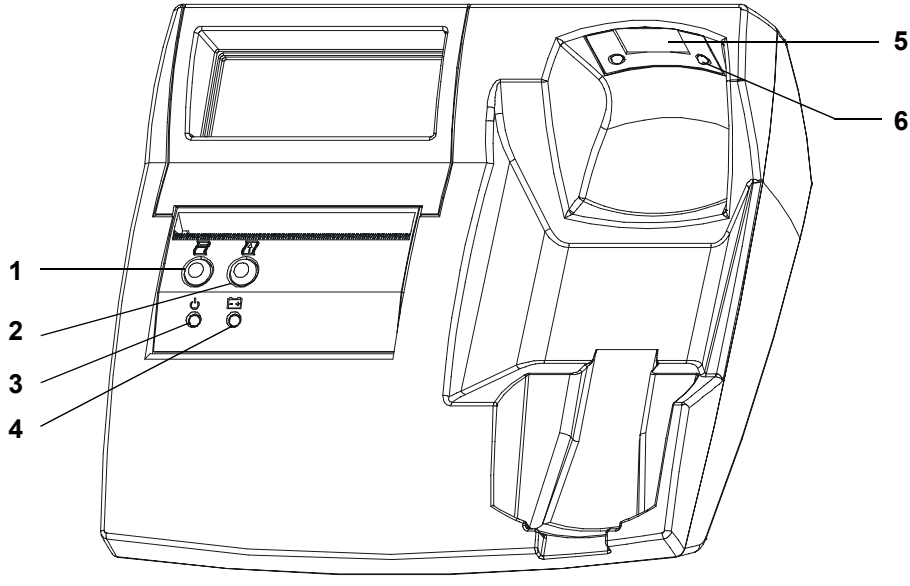


Figure 2 Printer/Charger Module (PCM) Features (Front)

1 Print button

2 Paper Advance button

3 Power/Status LED

Off — Charger not connected to Mains power
On — Charger is connected to Mains power
Single Flashes — Out of paper
Double Flashes — Printer or Charger malfunction
For more information, see *Troubleshooting* on page 49.

4 Battery LED

Off — No Screener in Charger
On — Screener seated correctly in Charger, and charging

5 IrDA port for communication with Screener

6 Charging contacts for recharging Screener

Rear View

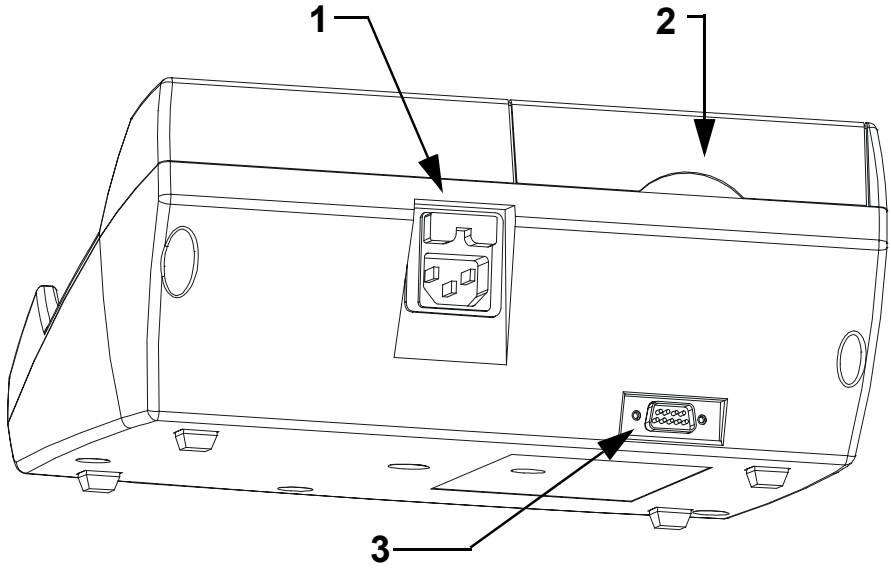


Figure 3 Printer/Charger Module (PCM) Features (Rear View)

1 Fuse drawer and Mains power connector

2 Paper cover
Push here and lift up to open.

3 RS-232 connector to attach Printer/Charger Module (PCM) to a computer

Setting Up the AudioPath Screener

This section covers setting up the Screener for your working environment. Depending on the accessories you purchased and the setting in which you intend to use the Screener, you may need to do one or more of the following:

- Adjust the brightness of the LCD (Screener display)
- Check the battery

This section covers these setup steps as well as checking the battery before you begin testing.

Checking the Battery

To check the battery, turn on the AudioPath Screener by pressing any button.

- If you see a low-battery icon ( ) in the upper-right area of the display, you need to recharge the AudioPath Screener. This icon means you have up to eight minutes in which you can conduct and store about six more tests. The AudioPath Screener will not allow a test to begin unless there is sufficient battery charge to complete the test. See *Recharging the Battery* on page 39.
- If you do not see the low-battery icon, the AudioPath Screener has sufficient charge.

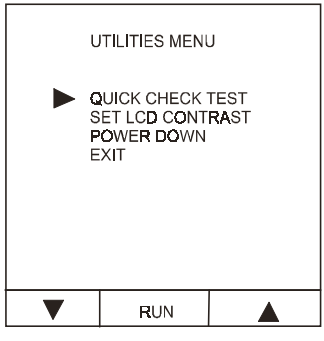
Adjusting the LCD Contrast

If you cannot see the display clearly, you may adjust the contrast of the LCD to suit the light in your work environment.

To adjust the LCD contrast:

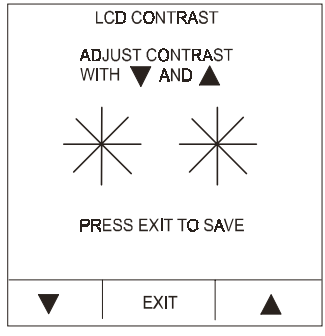
1. Press the left (blue) and right (pink) buttons simultaneously.

   The Utilities Menu appears.



2. Press the down arrow button to move the pointer to the SET LCD CONTRAST option, then press RUN.

   The LCD Contrast screen appears. The stars are there to help you see the contrast better.



3. Use the up or down arrow buttons to adjust the contrast to your preference, then press EXIT.

   The blank DPGram screen appears, and the Screener is ready for testing.

Connecting the Printer/Charger Module (PCM) to Mains Power

To set up the Printer/Charger Module (PCM) and connect it to Mains power:

1. Place the Printer/Charger Module (PCM) on a sturdy, level surface near an electrical outlet. Make sure the Printer/Charger Module (PCM) is not near a source of moisture or direct heat.
2. Attach the supplied power cord to the back of the Printer/Charger Module (PCM). See *Figure 3, Printer/Charger Module (PCM) Features (Rear View),* on page 9.
3. Plug the other end of the cord into the electrical outlet for Mains power.

   The POWER/STATUS LED on the Printer/Charger Module (PCM) turns on.

Preparing for a Test

NOTE: Be sure to remove the screener from the Printer/Charger Module (PCM) before testing.

Selecting an Eartip

Examine the patient's ear canal then select an eartip that will fit snugly inside the ear canal. Refer to the following table.

Table 2 – Guide to Eartip Selection

Eartip Size	**Fits These Patients** (Approximations only)
3 – 5 mm	Newborns
5 – 6 mm	Infants
6 – 9 mm	Young Children
9 – 14 mm	Adults (Age 10 and up)
15 – 16 mm E3 – E4	Adults with very large or non-cylindrical ear canals

Attaching an Eartip to the Probe Tip

To attach an eartip to the probe tip:

1. Slide and twist the eartip clockwise onto the probe tip until the eartip is seated snugly against the junction where the probe tip widens (Figure 4).
2. Inspect the end of the probe tip to ensure you can see the ends of all three metal tubes clearly (verify the eartip is not blocking any tubes).

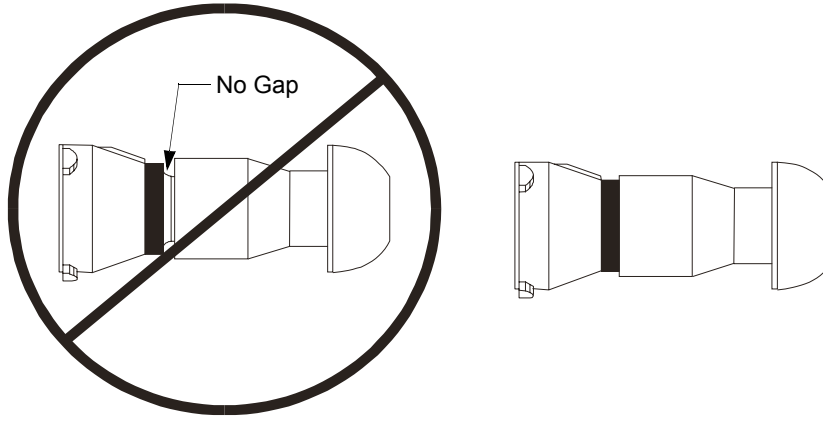


Figure 4 Attaching an Eartip to the Probe Tip

When removing an eartip, twist the eartip clockwise and pull gently. Discard used eartips.

Always attach and remove eartips using a clockwise twisting motion. A counter-clockwise twist may remove the probe tip from the Probe.

KEEP EARTIPS OUT OF REACH OF INFANTS AND YOUNG CHILDREN. MAY BE A CHOKING HAZARD.

Securing the Pod and Probe to the Screener

To make it easy to carry the Screener from patient to patient, you can attach the Pod to the Screener body, and the Probe (without an eartip attached) to the Pod. You can leave the Pod attached to the Screener while running tests.

Remove eartip before attaching the Probe to the Pod.

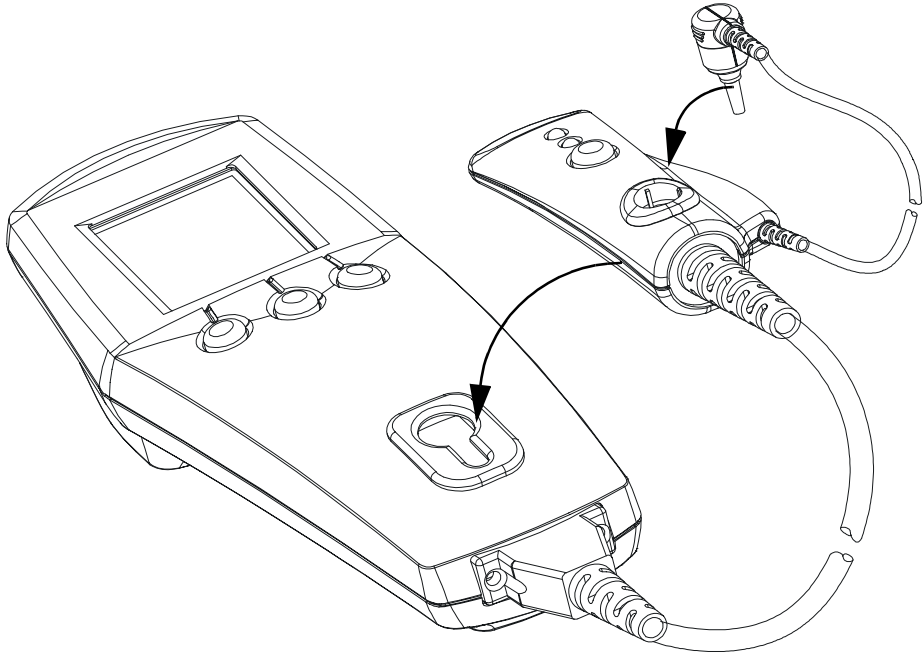


Figure 5 Attaching Probe to Pod, and Pod to Screener

To attach the Pod to the Screener, align the "button" on the under surface of the Pod with the circular opening in the Screener. Press down on the Pod case while sliding the Pod into the keyed opening on the Screener. (To remove the Pod, slide it forward and pull it out of the circular opening.) Gently insert the Probe into the opening on the Pod until it fits snugly. (It is not necessary to force the Probe into a secure position.)

Power-Up Display

When you turn on the AudioPath Screener, it performs a brief self-test.

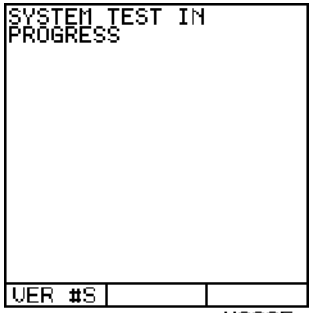


Figure 6 Power-Up Display

Version Information

To see the software and hardware versions of the AudioPath Screener, press VER # as soon as the Power-Up screen appears. The System Information screen appears, listing the software and hardware versions for all the major components of the AudioPath Screener.

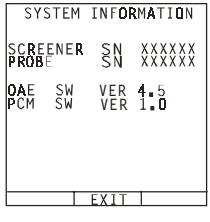


Figure 7 System Information Screen

Press EXIT to continue system initialization.

After the self-test, the Screener displays the message SYSTEM LOADING. When the Screener is ready to use, a blank DPGram appears.

Blank DPGram

A DPGram is the graphical representation of the patient's test results. When the Screener is ready to begin testing and the memory is empty, it displays a blank DPGram. (NOTE: if test data is present in the Screener memory, the last test stored will be visible on the DPGram display.)

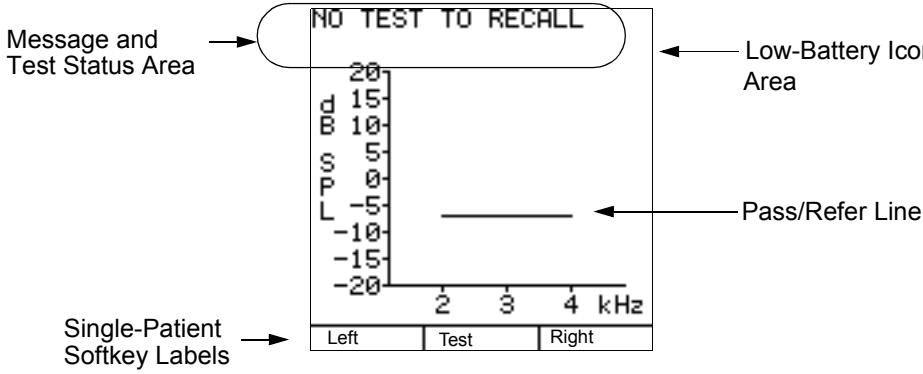


Figure 8 Blank DPGram

- Across the top of the display, messages appear about the test and the status of the Screener, such as error conditions.
- In the upper-right area of the display, the low-battery icon appears when the battery level is almost too low to continue testing. See *Recharging the Battery* on page 39. (The AudioPath Screener will not allow testing if the battery charge is too low for valid testing.)
- The line across the middle of the graph represents the PASS/REFER line. See *Reviewing the Test Results* on page 31.
- The labels across the bottom of the display indicate the function of the buttons directly below them on the Screener.

Completed DPGram

As the AudioPath Screener conducts a test, the display shows the:

- Response from the outer hair cells within the cochlea, called the distortion product or DP
- Averaged noise level within the ear canal, called the noise floor or NF

Before storing the result, the DP is shown as a solid circle and the noise floor is shown as a solid rectangular bar.

When the test is complete, the Screener displays the message OAE TEST COMPLETE and the test result.

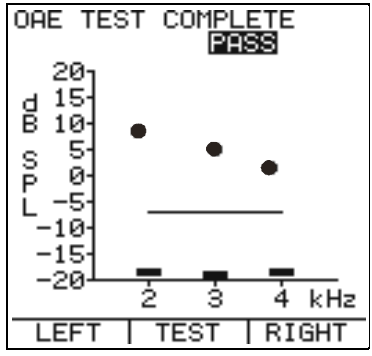


Figure 9 Single-Patient Completed DPGram (not yet stored in memory)

Stored DPGram

When you store a DPGram, the Screener replaces the message OAE TEST COMPLETE with LEFT EAR or RIGHT EAR.

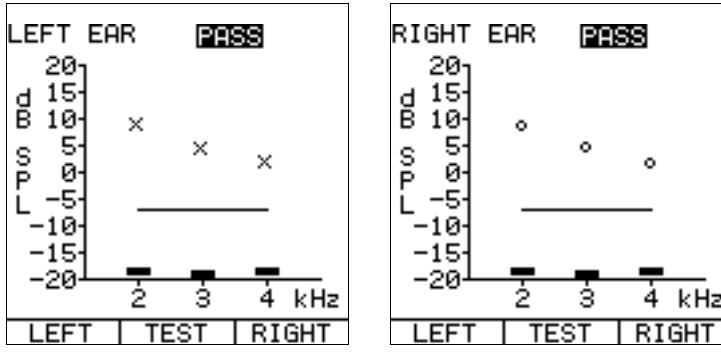


Figure 10 Stored DPGrams: Left and Right

The DPs change from solid circles to standard audiometric symbols, according to which button you pressed:

X	Left Ear	———	(Blue Button)
O	Right Ear	———	(Pink Button)

Using the Screener 4

This chapter describes the operation of the AudioPath Screener:

- Daily check of the Screener's performance
- Running a test
- Storing a test
- Printing a test
- Stopping a test
- Retrieving a test
- Erasing a test
- Turning off the Screener

The two LEDs on the Pod indicate the status of the Screener while testing and allow you to monitor the test's progress:

- The green LED flashes while the Screener is checking the eartip's seal in the patient's ear and becomes solid green while the test runs. When the test is complete, the green LED turns off.
- If the Screener detects a problem with the eartip seal, the yellow LED turns on and the green LED turns off.
- If both LEDs are turned on, the Screener is connected to a Printer/Charger Module (PCM) or a charging transformer and it is not testing.

Checking the Screener's Performance

Each day, or before each work shift, check the Screener's performance by running the Quick Check test with the included Quick Check Cavity. This test takes about 10 seconds and ensures that the Screener is working properly and that your test results will be reliable.

Run the Quick Check test at least once a day.

See *Running the Quick Check Test* on page 42.

Running a Test

1. Remove the Screener from the Printer/Charger Module (PCM) and press any button on the Automated OAE Screener to turn it on.

   After a few seconds, the blank DPGram appears if no prior results are stored in memory.

NOTE: The test key will not appear if the battery is too low to run a test or while the Screener is placed in the Printer/Charger Module (PCM).

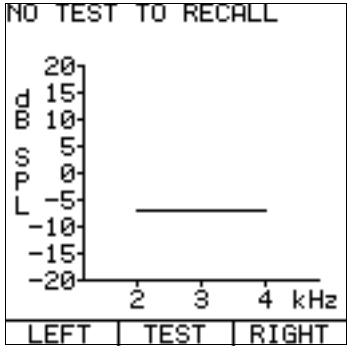


Figure 11 Blank DPGram

2. Insert the probe tip with an eartip attached into the patient's ear, seating the eartip well into the ear canal to achieve a tight seal.

3. To start a test, do one of the following:
   - Press the Pod button (green)
   - Press TEST (green) on the Screener

NOTE: The test key only shows if the Screener is not connected to a charging device and the battery is charged enough to finish a test. Otherwise, the test key is not visible and the unit must be charged.

The Screener displays CHECKING FOR OAE PROBE IN EAR.

If the eartip is not properly sealed in the patient's ear, the Screener does not start a test. After 30 seconds, the Screener stops checking for a seal and displays the message ABORT.

If the eartip seal is good, the Screener displays TESTING OAE. When the test is complete, the Screener displays:

- OAE TEST COMPLETE
- A graph of the test data
- The test result (see *Reviewing the Test Results* on page 31)

The Pod's green LED turns off.

Message CHECK SEAL

After a test has begun, if the AudioPath Screener detects a problem with the eartip seal, it pauses the test and displays CHECK SEAL. Reposition the probe tip in the patient's ear, use a different size eartip, or clean any debris from the probe tip before proceeding.

When the seal is acceptable, the AudioPath Screener restarts the test automatically and redisplays TESTING OAE.

If a second seal problem occurs, the AudioPath Screener stops the test. The display shows:

- OAE TEST COMPLETE
- The data, if any, collected to that point
- The test result ABORT

You can store any data the Screener collected.

Storing a Test

To store a just-completed test:

- Press the button for the ear you just tested (LEFT – blue or RIGHT– pink).

  The Screener stores the data and replaces the message OAE TEST COMPLETE with LEFT EAR or RIGHT EAR.

The Automated OAE Screener stores two results, one test per ear. Each time you press LEFT or RIGHT to store a new test, the Screener overwrites the last test stored for that ear.

Reviewing a Test

To review a stored test:

- Press LEFT or RIGHT to recall the data for that ear to the screen.

If there is no stored data for the button you pressed, the AudioPath Screener displays NO TEST TO RECALL.

The data for each ear remains in permanent memory until the next time you store (and thereby overwrite) a test, even when the AudioPath Screener is off or the battery is removed.

Printing a Test

At any time, you can print the stored tests in the Screener. The Screener sends all the stored data, whether for one or two ears, to the printer. You cannot print data for only one ear if the Screener contains stored data for two ears.

You do not need to retrieve stored test data to print it.

To print the stored data:

1. Turn on the Screener.
2. Place the Screener in the Printer/Charger Module (PCM).

3. Press PRINT.

   The Screener displays TRANSFER TO PRINTER. If the transfer is successful, the Screener displays TRANSFER COMPLETE, and the printout begins.

   If there is no stored data to print, the Printer/Charger prints `No Data`.

   If you remove the Screener before the printer receives all the data, the message REMOVED TOO SOON appears on the Screener display and the printer.

4. To continue testing, wait until the printout begins (about three seconds after you press PRINT) then remove the Screener from the Printer/Charger Module (PCM).

Contents of the Printout

The printout (Figure 12 and Figure 13) includes:

- Spaces to write the patient's name or Patient ID number, and the date
- The ear tested (Right or Left) and the test result for each test for one or two tests
- One or two DPGrams that display the DP (distortion product) points and NF (noise floor) points and the Pass/Refer line
- One or two tables containing the actual numeric values for the patient's DPs and NFs, and the difference between the two points (signal to noise ratio) for each frequency

  All DP values at or above 20 dB are shown on the 19 dB line. All NF values at or below -20 dB are shown on the -19 dB line. The table contains the actual distortion product and noise floor values.
- The serial numbers for the Screener and the Probe, and the Protocol used for the test
- Product identification information

Figure 12 shows a sample single-ear test printout.

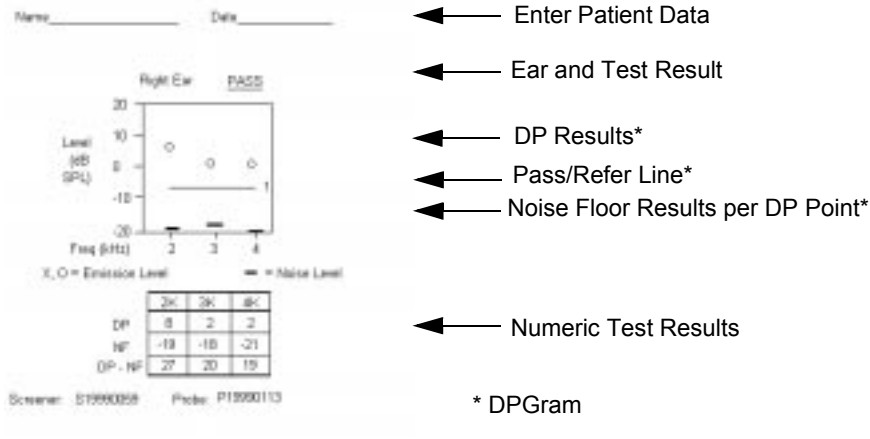


Figure 12 Printout — Single-Ear Test

Figure 13 shows a sample double-ear test printout.

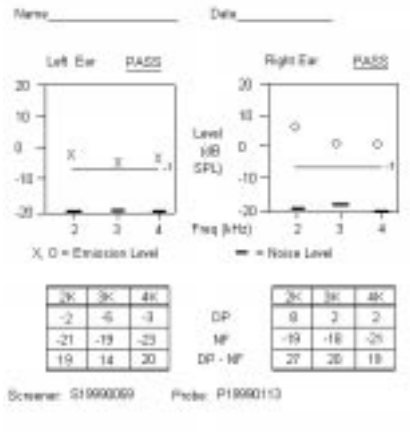


Figure 13 Printout — Double-Ear Test

Canceling the Printout

To stop a printout in process, press PRINT on the Printer/Charger Module (PCM).

The printer immediately stops printing the test, and prints `Print cancelled` on the next line.

Advancing the Paper

To advance the paper, do one of the following:

- Press PAPER ADVANCE. The paper advances by one line.
- Hold down PAPER ADVANCE. The paper advances continuously until you release the button.

Stopping a Test

To stop a test in progress:

- Press the Pod button.

  The Automated OAE Screener displays OAE TEST COMPLETE ABORT and any data collected to that point.

If you press RIGHT or LEFT after stopping a test in progress, the Screener saves the stopped test and overwrites any previously stored data for that ear.

To start a new test, do one of the following:

- Press the green Pod button
- Press the green TEST button on the Screener

Erasing a Test

There are two ways to erase a test. Either:

- Store a new test for the same ear

  This action overwrites the previously stored test in that memory location (LEFT or RIGHT).
- Press and hold LEFT or RIGHT for four seconds and then release the button. The data is cleared and the AudioPath Screener displays DATA ERASED.

If there is nothing to erase, the AudioPath Screener displays NO TEST TO ERASE.

Power-Saving Mode

The Screener has a power-saving mode that preserves the battery's charge when you are not running tests. This power-saving mode allows the Screener to preserve the battery charge, yet be ready to continue testing quickly. In this mode, the last screen displayed remains in memory and the display backlighting turns off.

The Screener enters this power-saving mode after 45 seconds of inactivity, as long as the Screener is not either placed in the Printer/Charger Module or connected to the Charging Transformer.

To exit the power-saving mode, press any button. The display lights up and the Screener is immediately ready to use. Any data that was on the screen, including unsaved test data, reappears.

When the Screener is not being used, place it in the powered Printer/Charger Module (PCM) to increase the battery charge.

Power-Down

You never have to turn off the Screener. The Screener turns itself off completely under the following conditions:

- If the Screener remains idle for two minutes after it enters the power-saving mode
- If the Screener is either placed in the Printer/Charger Module or connected to the Charging Transformer, it turns off completely after 45 seconds and does not enter the power-saving mode.

When the Screener powers down, it does not retain the information (such as an unsaved test) that was on the display.

To turn on the Screener, press any button.

- To turn the Screener off immediately, go to the utility menu by pressing the left and right buttons simultaneously, move the selector arrow to Power Down and select. See the Utilities Menu on Page 10.

Low-Battery Icon

When the battery's charge nears the minimum usable level, a low-battery icon ( ) appears on the display. You then have up to eight minutes in which you can conduct and store about six more tests. The AudioPath Screener will not allow a test to begin unless there is sufficient battery charge to complete the test.

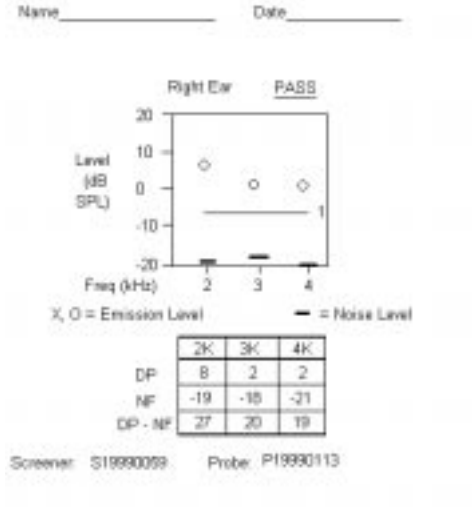
When the battery level falls too low, the AudioPath Screener turns off. All previously stored test data remains intact. See *Recharging the Battery* on page 39.

Test Result PASS

A screening result of PASS means that at the time of testing, the cochlea responded well to the tones presented through the probe. Each OAE response is above the PASS/REFER line, and the noise level at each frequency tested is at least 10 dB below the corresponding OAE response.

An X (left ear) or an O (right ear) is used to represent the OAE response. The thin line, which runs horizontally from 2k to 4k Hz, represents the PASS/REFER line. The solid dashes represent the intensity of the noise present within the ear canal during each OAE measurement at 2k, 3k, and 4k Hz.

The example printout below for PASS indicates that the intensity of the OAE responses at 2k, 3k, and 4k Hz are 21 dB, 5dB, and 4 dB, respectively. The noise floor measured at each OAE frequency is -14 dB, -25 dB, and -35 dB, respectively. As a result, this example shows a very large separation between the OAE (X) and the noise floor (--). The values for this separation (signal-to-noise) are at 35 dB (2k), 30 dB (3k), and 39 dB (4k), respectively. The AudioPath Screener scores the test result as a PASS when the OAE responses are above the PASS/REFER line and the signal-to-noise is at least 10 dB.



Test Result REFER

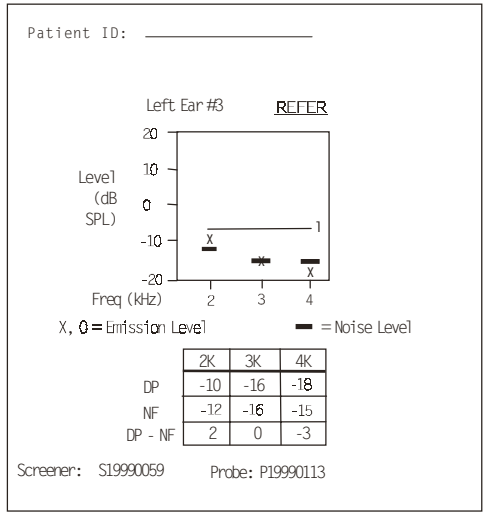
An OAE screening scored as REFER indicates that both the OAE response and the noise floor at each test frequency are very low. Any DP recorded below the PASS/REFER line will reflect a REFER test result.

In this example, the OAE response at 2k, 3k, and 4k Hz are -10 dB, -16 dB, and -18 dB, respectively. The noise floor at each frequency is sufficiently low to allow the AudioPath Screener to reliably measure for an OAE response. The OAE responses are also very low in intensity at each frequency. When a REFER result is obtained, it is recommended that the test be run a second time to see if it is repeatable. If the result is repeatable, there are at least three possible explanations:

1. The cochlea is not responding well to the tones being presented due to some problem at the outer hair cells.
2. There is fluid present within the middle-ear space that is preventing the stimulating tones from reaching the cochlea at a high enough intensity to activate the OAE response.
3. The ear canal and/or the probe tip are plugged with vernix or debris that is preventing the tones from traveling through the middle ear to the cochlea. Thus, the outer hair cells are not being activated properly.

It is highly recommended that the screening session be repeated as the possible conditions described in 2 and 3 above may be resolved over time.

If the results are not repeatable, check the probe tip for debris and re-check the ear canal for size and shape. Clean the probe tip with the cleaning wires or select a different size ear tip before repeating the test once again.

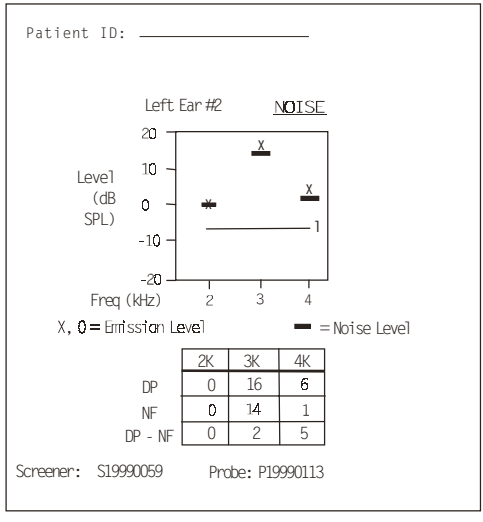


Test Result NOISE

A response is scored as NOISE when there is either too much biological or room noise present while performing the test. This noise prevents the AudioPath Screener from being able to accurately measure the presence of an OAE response.

The example shows that the noise floor at each OAE frequency of 2k, 3k, and 4k Hz is at or above 0 dB. When the noise floor is high, it is very difficult to obtain a 10 dB separation between the OAE response and the noise floor. In the current example, the signal-to-noise is 0 dB (2k), 2 dB (3k), and 5 dB (4k). The separation between the OAE response and the noise floor is too small to reliably score the test result as a PASS or REFER. The score of NOISE indicates that either room noise or the baby's biological sounds are interfering with data collection, the ear canal is collapsed, or the ear tip fit is poor.

You can store any data the Screener collected.



Test Result ABORT

The result ABORT means either:

- You stopped a test by pressing the green Pod button.
- The Screener detected that the eartip was not making a good seal in the patient's ear and stopped running a test.

In both cases, if you see a stored test with the result ABORT, it means you saved the test. There may be no data points or only one or two. Any data points are valid, since the Screener stops collecting data when the eartip's seal in the ear is broken. However, you should run a new test, since the result ABORT does not indicate the test status as a PASS or a REFER.

Maintenance 6

This section describes the basic procedures to maintain your system:

- Cleaning the Screener, Printer/Charger Module (PCM), and probe tip
- Recharging the battery
- Checking the Screener with the Quick Check Cavity
- Checking the Printer/Charger Module by printing a test pattern

Cleaning

You can clean the following components of the AudioPath Screener System:

- Exterior of the Screener and PCM
- LCD display
- Cables
- IrDA port windows and charging contacts
- Probe tips

The eartips are intended for a single use only. Discard after use.

The following procedures describe how to clean the system components.

Cleaning the Housings, Display, and Cables

To clean the exterior of the AudioPath Screener (including the display), the Pod and Printer/Charger, and the cables, use a lint-free cloth moistened with either:

- Plain water
- Water and a mild detergent/soap solution
- 70% isopropyl alcohol

To avoid damaging the instrument, do not:

- Spray anything directly onto the Screener display
- Immerse instruments in water or cleaning solutions
- Autoclave the instruments

Cleaning the Probe Tips

Clean the probe tips with the supplied Cleaning Kit:

- At the start of every day or shift
- After testing an ear that contained cerumen, vernix, or other material
- Whenever the following occurs:
  - Quick Check test fails
  - Screener reports unusual numbers of REFER results
  - Screener repeatedly cannot achieve a seal in a patient's ear

  All of these events could indicate blocked probe tubes.

There are three parts to the probe tip cleaning process:

- Removing the probe tip from the probe
- Cleaning the probe tip
- Attaching the probe tip to the probe

Removing the Probe Tip

The probe tip is held in place by three tabs that fit into notches in the probe. The probe tip sits on a firm rubber gasket that provides pressure to hold the probe tip in place.

To remove the probe tip:

1. Push the probe tip into the probe to compress the rubber gasket, and turn the probe tip counter-clockwise about one-sixteenth turn.
2. Lift out the probe tip.

The probe is vulnerable to dust and moisture. Do not put the probe on a dirty or wet surface.

Cleaning the Probe Tip

To clean the probe tip:

1. Moisten a tissue or lint-free cloth with 70% isopropyl alcohol.
2. Push the large cleaning wire through the large diameter probe tube, from the back (large end) toward the front (Figure 14).

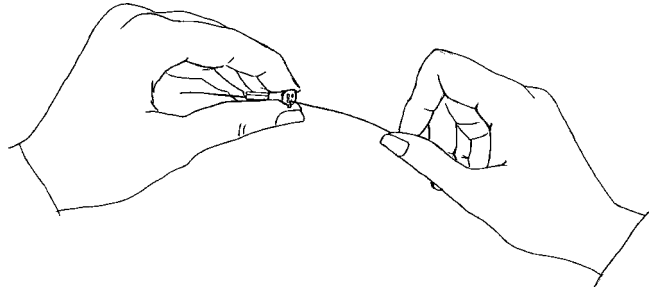


Figure 14 Cleaning the Probe Tip

3. Wipe off the cleaning wire with the moistened tissue, then pull the wire back out of the tube.
4. Push the smaller cleaning wire through one of the smaller diameter probe tubes, from the back toward the front.
5. Wipe off the cleaning wire with the moistened tissue, then pull the wire back out of the tube.

6. Repeat steps 4 and 5 for the other small probe tube.

Do not attempt to clean probe tip while attached to probe. Debris may become lodged in probe.

Attaching the Probe Tip to the Probe

To attach the probe tip to the probe:

1. Align the tabs on the probe tip with the notches in the probe, so that the white alignment markers on each piece are between the same pair of notches (Figure 15).
2. Push the eartip firmly into the probe, and turn clockwise about one-sixteenth turn.

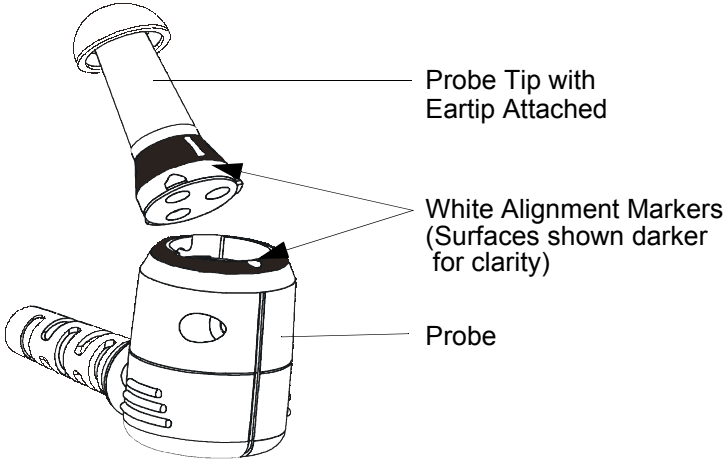


Figure 15 Attaching an Eartip to the Probe

When the probe tip is correctly locked in place, the white alignment markers line up.

Cleaning the Infrared Port Windows and Charging Contacts

Disconnect the Printer/Charger from Mains power before cleaning the charging contacts.

Use a lint-free cloth moistened only with water to clean:

- Charging contacts in the Printer/Charger
- Infrared port windows on the Screener and the Printer/Charger

Recharging the Battery

To recharge the battery, do one of the following:

- Plug the Printer/Charger Module (PCM) into the Mains outlet. Place the AudioPath Screener in the PCM.
- Connect the round DIN connector of the optional Charging Transformer to the AudioPath Screener, then plug the transformer (or the attached cable) into the Mains outlet (Figure 16).

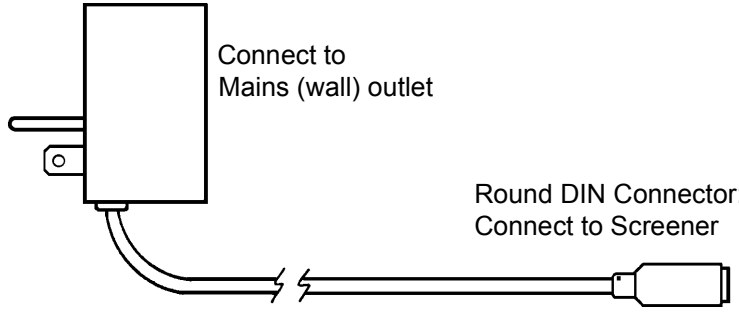


Figure 16 Charging Transformer (Example - Plug Styles Vary)

Charge the AudioPath Screener *only* in the Printer/Charger or with the specified Charging Transformer.

Do not charge the battery if the ambient temperature exceeds 113°F (50°C). Charging the battery at high temperatures causes the battery to overcharge and become extremely hot. This will ruin the battery and possibly damage the instruments.

Both PCM LEDs are turned on. The TEST key is disabled so that the AudioPath Screener will not conduct any tests while connected to mains power. After 45 seconds of inactivity, the Screener will be turned off.

The Screener may be charged indefinitely (longer than five hours) without damage to the battery. Slight heating of the Screener while charging is normal.

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Removing or Replacing the Battery

1. Using your thumb, turn the battery cover screw counterclockwise approximately one-half turn.

   The screw is attached to the battery cover; it pops halfway out of the hole but remains attached to the cover.

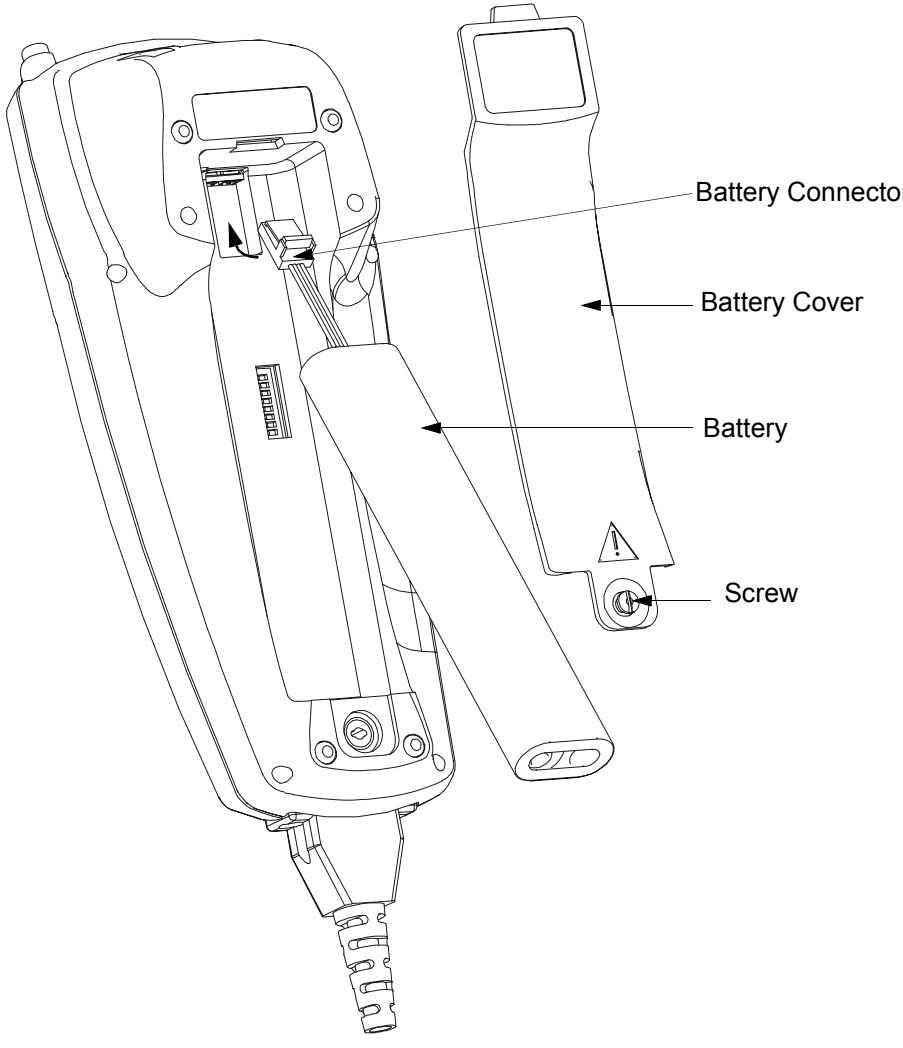


Figure 17 Battery Connection

2. Pull gently on the screw until the cover lifts out.

3. Press the tab on the battery connector and pull the two halves apart. Lift out the battery.
4. Align the connector on the replacement battery with the connector in the Screener, and slide the connector in until the tab locks into place You will hear a click when it locks.

   Install the battery as shown. The two parts of the connector are keyed and fit together only one way.
5. Replace the battery cover by sliding the cover's tab into the notch in the Screener, then fitting the cover into place.
6. With your thumb, push the screw down into the hole and turn approximately one-half turn clockwise to tighten. Do not over-tighten.

When removed from the Screener, the battery discharges gradually over a period of approximately a year when stored at room temperature (70°F/21°C); storage at higher temperatures increases the discharge rate. Long-term storage does not affect the battery's recharge capacity.

Remove the battery if you plan to store the AudioPath Screener or place it anywhere other than in the powered Printer/Charger Module for more than one month. After you remove the battery, do not place the Screener in the powered Printer/Charger Module.

Recycling the Battery (North America only)

Welch Allyn works with an agency that can disassemble and recycle all the components of nickel-cadmium batteries so nothing gets placed in a landfill. To recycle an expended Welch Allyn rechargeable battery, please send it to either:

WELCH ALLYN
RECYCLE BATTERY
4341 State Street Road
Skaneateles Falls, NY 13153-0220

WELCH ALLYN CANADA
RECYCLE BATTERY
160 Matheson Blvd. East, Unit 2
Mississauga, Ontario Canada LZ4 1V4

NICKEL-CADMIUM BATTERY. MUST BE RECYCLED OR DISPOSED OF PROPERLY.

NOTE:If the battery is removed for more than five minutes, the Date and Time settings in the Screener will be lost.

Checking the Screener

Use the supplied Quick Check Cavity to perform a rapid functional check of the AudioPath Screener. This is a simple test to perform and indicates that the Screener is working properly.

Welch Allyn recommends using the Quick Check Cavity at least daily. For example, your department or facility might decide to check the AudioPath Screener at the start of each shift.

The test, which takes about 10 seconds, detects:

- Plugged microphone or speaker chambers in probe
- Change in speaker or microphone sensitivity
- Loss of output from one or both speakers
- Loss of output from microphone

Running the Quick Check Test

To run the Quick Check Test:

1. Simultaneously press the left and right (blue and pink) buttons.

   The Utilities Menu appears on the display. An arrow points to the first menu option, Quick Check Test.

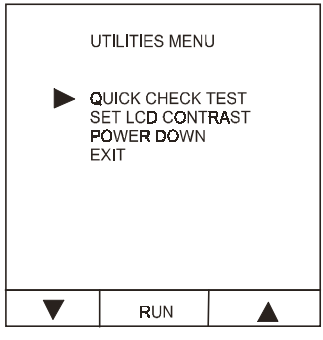


Figure 18 Utilities Menu

2. Press RUN.

   The Quick Check Test screen appears.

Figure 19 Quick Check Test — Start Screen

3. Attach a 4mm eartip onto the probe tip.
4. Insert the probe into the Quick Check Cavity.
5. Press NEXT.

   The AudioPath Screener quickly performs several tests, and some numbers appear briefly on the display. You do not need to observe these numbers. When finished, the Screener displays the test result.

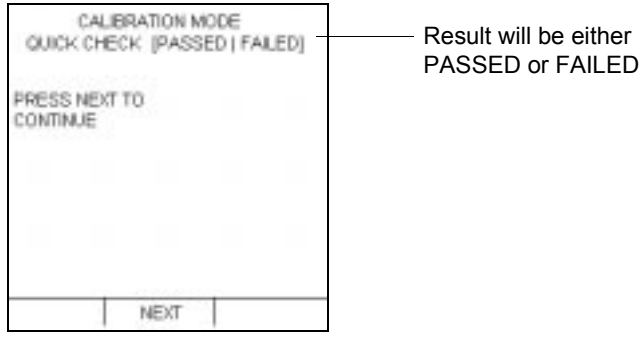


Figure 20 Quick Check Test — Result

Quick Check Passed

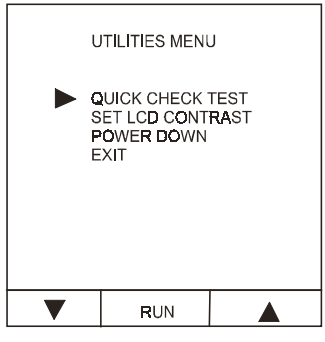
If the Screener passed, you may perform OAE tests.

1. Press NEXT to return to normal testing mode.
2. See *Using the Screener* on page 21.

Quick Check Failed

1. Inspect the tubes in the probe tip. The tubes may be blocked with cerumen or other material.
2. Clean the probe tip. See *Cleaning the Probe Tip* on page 37.
3. Run the Quick Check test again.
4. If the Quick Check fails a second time, press NEXT to return to normal testing mode and allow the AudioPath Screener to turn off.
5. Replace Probe/Pod assembly by removing the screens from the connector, if you have a spare probe.
6. Contact your Service Representative. The Probe/Pod assembly requires service before you can use it again.

Checking the Printer/Charger Module



When you connect the Printer/Charger Module (PCM) to Mains power, it performs a self-test. The PCM also checks whether the printer is out of paper and identifies any other error conditions.

- If the printer is out of paper, the POWER/STATUS LED (⏻) flashes singly. Install a new roll of paper (see *Replacing the Paper* on page 46). The LED stops flashing when the paper is installed.
- If the printer is malfunctioning, the POWER/STATUS LED flashes doubly. Disconnect the Printer/Charger from Mains power and wait about five minutes before reconnecting to power. The printer may be overheated, and this allows it to cool down. If this does not correct the problem, the Printer/Charger may require service. Contact your local Welch Allyn Service Representative. (You may continue to use the Printer/Charger to charge the Screener.)

Printing a Test Pattern

You can check the printer quickly by printing out a test pattern. This lets you verify that the printer is working.

To print a test pattern:

1. Make sure that:
   - Printer/Charger is plugged into Mains power and contains paper
   - POWER/STATUS LED is lit
   - No LEDs are flashing
2. Simultaneously press PRINT and ADVANCE.

   The printer prints a test pattern that looks like this:

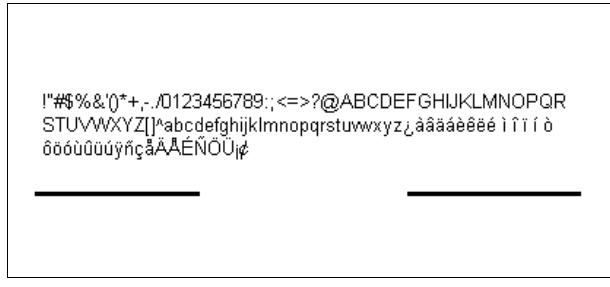


Figure 21 Test Print

This test pattern indicates that the printer is working properly.

If the test pattern does not print out or if you see any flashing LEDs, consult Table 4 on page 54

About the Printer Paper

Use only:

- Heat-sensitive paper available from Welch Allyn (##29236).
- Adhesive-backed paper available from Welch Allyn (#29240).

Using the wrong paper can wear out the printer prematurely and may void the warranty.

The paper is thermally activated. Before use, store the paper in a cool, dark location to prevent exposure and degraded performance. After printing test results, store the printouts in a cool, dark place such as a patient's file folder. Exposure to light, sun, and heat will degrade the printing, and over time the results will be illegible.

Only one side of the paper is thermally active; no printing will appear on the paper if you insert it backwards.

Do not use transparent adhesive tape on printed portions of the printout, as those portions will fade.

When to Replace the Paper

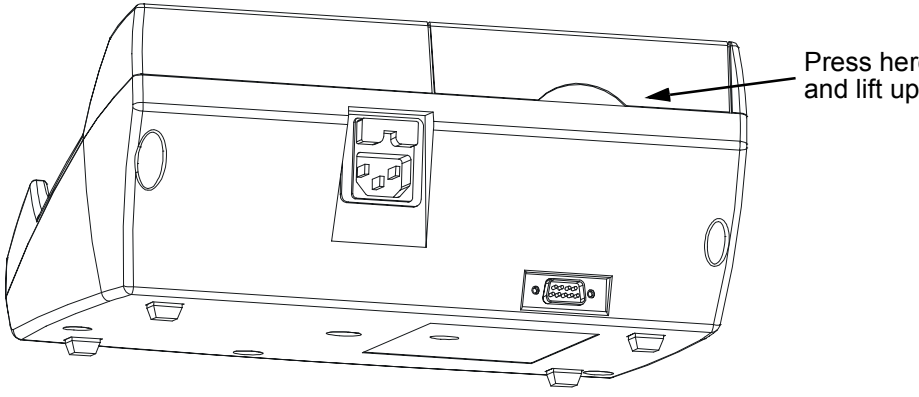
Replace the paper roll in the PCM when either of the following happens:

- A pink strip appears along the edge of the paper, indicating the paper is nearing the end of the roll
- The POWER/STATUS indicator flashes in single pulses, indicating the printer is completely out of paper

Replacing the Paper

To replace the paper:

1. Remove the eartip box from the well of the PCM.
2. Press the depression on the back edge of the paper cover to release the latch.
3. Carefully lift the back of the cover up and out of the PCM.

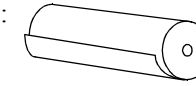


4. Lift out the paper roll and tear off any remaining paper against the back edge of the paper well.

Do not pull the paper backwards out of the printer. This will damage the mechanism.

5. Press ADVANCE to remove the remaining paper.

6 Place a new roll of paper in the cavity, with the paper's leading edge coming from underneath the roll, toward the front of the cavity, like this:



7. Make sure the new paper has a straight edge. Feed the leading edge squarely into the paper guide.

   The printer automatically pulls the paper in and stops when the paper's top edge is positioned correctly. If the paper is not evenly aligned with the cutting edge, tear off the new roll, trim the edge, remove the remaining paper using ADVANCE, and try again.

8. Replace the printer cover, first inserting the tabs into the notches, then pressing the back edge down until it clicks into place.
9. Replace the eartip box in the well.

The POWER/STATUS LED stops flashing, and the PCM is ready to print tests.

Troubleshooting 7

This chapter covers:

- Error messages that may appear on the Screener
- Possible causes and solutions for problems with the Screener or Printer/Charger Module

Error Codes

If an ERROR message followed by two sets of numbers appears on the display, for example:

ERROR 25 802 or ERROR 5017 14

this indicates the AudioPath Screener requires service before you can use it again.

If this happens:

1. Allow the AudioPath Screener to turn off.
2. Contact your local Service Representative.

Troubleshooting Tips

Screener Problems

If you think your Screener is not working properly, consult Table 3 to find the symptom and the likely cause and its solution. If the information in this table does not describe or solve the problem you are having, call Technical Support. See *Service and Warranty Information* on page 59 for more information.

What to Check First

Make sure the Screener has a battery installed. See *Removing or Replacing the Battery* on page 40.

Table 3 – Troubleshooting Guide for the Screener

Problem	Possible Cause	Solution
Screener will not turn on	Battery drained	Charge the battery. See *Recharging the Battery* on page 39.

Table 3 – Troubleshooting Guide for the Screener (Continued)

Problem	Possible Cause	Solution
Screener will not run tests (LED blinks but no test starts)	Screener in Printer/ Charger cradle	Remove Screener from Printer/ Charger and try again. (Screener will not run tests while in contact with power source.)
	Screener connected to Charging Transformer	Unplug from Charging Transformer and try again. (Screener will not run tests while in contact with power source.)
	Probe malfunction	Run the Quick Check test. See *Running the Quick Check Test* on page 42. If Screener fails, call your local service representative.
	Loose cable	Check cable connection between Screener and Pod. Tighten the screws if necessary.

Table 3 – Troubleshooting Guide for the Screener (Continued)

Problem	Possible Cause	Solution
Screener does not recharge	Printer/Charger is not plugged in	Plug cable into back of Printer/ Charger, then into Mains (wall) outlet.
	Charging contacts are blocked or dirty	Inspect and clean charging contacts in Printer/Charger and on Screener. See *Cleaning the Housings, Display, and Cables* on page 36.
	Screener not seated properly in Printer/ Charger	Remove and replace Screener in cradle.
	Charging Transformer is not connected properly	Plug round end of Charging Transformer into back of Screener, plug large square end into Mains (wall) outlet. See *Recharging the Battery* on page 39.
Cannot see anything on Screener display, but LCD is lit	Contrast misadjusted	See *Adjusting the LCD Contrast* on page 10.

Table 3 – Troubleshooting Guide for the Screener (Continued)

Problem	Possible Cause	Solution
Yellow LED appears on Pod	Probe not seated properly in ear canal	Reposition eartip in ear canal. Align eartip straight in for adults and children, slightly anterior for infants and newborns. Try a different size eartip.
	Probe tip not fully attached to Probe	Remove and reattach probe tip; make sure white marks in probe and probe tip line up. See *Attaching the Probe Tip to the Probe* on page 38.
	Probe tip blocked	Remove and inspect the probe tip. Clean if necessary. See *Cleaning the Probe Tip* on page 37. Run the Quick Check test. If Screener fails, call your local Service Representative.
Screener displays incorrect language	DIP Switches set wrong	See *Changing the Language Setting for the Screener* on page 70.
Screener comes up in Diagnostic or Calibration Mode	DIP Switches set wrong	Call your local Service Representative.

Printer/Charger Module Problems

If you think your Printer/Charger Module (PCM) is not working correctly, consult Table 4 to find the symptom and the likely cause and its solution. If the information in this table does not describe or solve the problem you are having, call your local Service Representative. See *Service and Warranty Information* on page 59 for more information.

What to Check First

Make sure the PCM is connected to Mains power. If the PCM is connected properly and has no other malfunctions, the POWER/STATUS LED will be on.

Table 4 – Troubleshooting Guide for the Printer/Charger

Problem	Possible Cause	Solution
Printer Prints "`No Screener`"	Screener not seated properly in PCM	Remove and replace screener in cradle.
Printer prints "`No Data`"	Screener contains no test data.	Run and save a test for one or more ears.
	If Screener does contain data, the PCM or Screener has an internal malfunction.	Call your local Service Representative.
	Infrared port window is blocked or dirty.	Inspect and clean Infrared port windows in PCM and on Screener. See *Cleaning the Housings, Display, and Cables* on page 36.
Printer does not print anything	Printer is out of paper.	Replace paper. See *Replacing the Paper* on page 46.
	Infrared port window is blocked or dirty.	Inspect and clean Infrared port windows in PCM and on Screener. See *Cleaning the Housings, Display, and Cables* on page 36.

Table 4 – Troubleshooting Guide for the Printer/Charger

Problem	Possible Cause	Solution
Printer prints `Removed too soon`	Screener removed from PCM before test data finished downloading.	Leave Screener in PCM for three seconds after you press PRINT.
POWER/STATUS LED flashing singly	Printer is out of paper.	Replace the paper. See *Replacing the Paper* on page 46.
POWER/STATUS LED flashing doubly	Printer may be too hot.	Unplug the Printer/Charger for about five minutes. Plug back into Mains power. If LED still flashes, call your local Service Representative. **You can still use the Printer/Charger to charge the Screener.**
Pink strip appears on paper	Paper is almost used up.	Replace paper. See *Replacing the Paper* on page 46.

Guide to Otoacoustic Emissions 8

What are Otoacoustic Emissions?

Otoacoustic emissions (OAEs) are sounds generated within the cochlea of all normal-hearing ears by active biomechanical processes within the outer hair cells. Since normal ears produce OAEs, the absence of an emission is a reliable sign of abnormal cochlear function, which could indicate hearing loss.

Otoacoustic emissions testing provides a fast, non-invasive method of testing for cochlear pathology. In addition, OAE testing is completely objective—making it ideal for hard-to-test patients such as infants, young children, or neurologically impaired patients.

How is an OAE Generated and Detected?

The OAE probe, similar to a tympanometry probe, contains two speakers and a microphone. Eartips cover the probe and seal the ear canal tightly. The probe speakers send tones to the ear canal. These tones travel through the middle ear and into the cochlea. Outer hair cells in the cochlea react to the tones by generating and emitting a third tone. This third tone then travels outward from the cochlea back through the middle ear to the ear canal, where the probe microphone detects it.

This emitted response has a very small amplitude and gets mixed in with other biological and environmental sounds present in the ear canal. Since the probe microphone detects all of these sounds, the instrument must use signal averaging techniques to separate the emitted response — OAE — (signal) from these other sounds (noise).

Since the microphone measures the response at the entrance to the ear canal, rather than at the site of its origination (the cochlea), the anatomy along the return path (i.e., the ossicular chain and the tympanic membrane) can influence the amplitude of the response. To identify these effects, measure the status of the middle ear using tympanometry screening whenever possible.

Testing with the Automated OAE

The AudioPath Screener uses Distortion Product Otoacoustic Emissions. Distortion Product Otoacoustic Emissions are emissions resulting from the presentation of a series of primary tone pairs.

The stimulus consists of a series of pure tone pairs. The instrument presents each tone pair and measures the OAE in an ascending or descending frequency pattern.

When the tone pair reaches the cochlea, each tone stimulates a different group of outer hair cells. As these two different groups are stimulated, they vibrate—causing a third tone to be generated between the two groups. This third tone is known as the *distortion product* (DP).

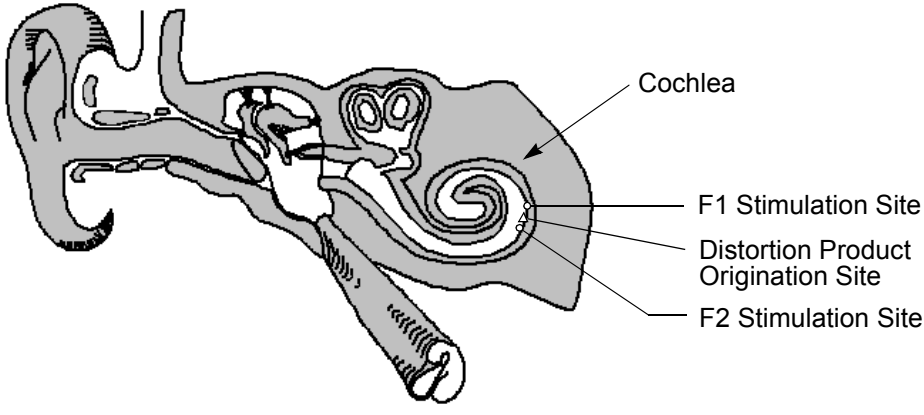


Figure 22 Example of Distortion Product Generation

The relationship between the tone pair's frequencies and intensity levels has an effect on the amplitude and frequency of the DP response. The lower frequency in each pair is referred to as F1. The higher frequency is F2.

Researchers have shown that an F2 to F1 ratio (F2/F1) of 1.2 (or 1.22) produces the most robust response in humans. Also, using a higher-intensity stimulus for F1 than F2 (by approximately 10 dB) provides greater test sensitivity.

The response from the cochlea during DP testing consists of a single frequency per tone pair presentation. The frequency of the DP equals 2F1 - F2. Since the frequency of the DP occurs within a narrow range, the instrument needs to use signal averaging only within a very narrow frequency band for each data point.

The equation 2F1 - F2 also tells the DPOAE system what specific DP response frequency to look for. Thus, the system can disregard any other tones that are present in the ear canal—making DPOAE testing far less sensitive to room noise than other test methods.

The AudioPath Screener displays DPGrams as a function of the F2 frequency.

Service and Warranty Information 9

Warranty for the Screener and Printer/Charger

Welch Allyn warrants the AudioPath Screener and Printer/Charger Module to be free of original defects in material and workmanship and to perform in accordance with manufacturer's specifications for a period of one year from the date of purchase. If this instrument or any component thereof is found to be defective or at variance from the manufacturer's specifications during the warranty period, Welch Allyn will repair, replace, or recalibrate the instrument or component at no cost to the purchaser.

This warranty only applies to instruments purchased new from Welch Allyn or its authorized distributors or representatives. The purchaser must return the instrument directly to Welch Allyn or an authorized AudioPath Screener distributor or representative and bear the costs of shipping.

This warranty does not cover breakage or failure due to tampering, misuse, neglect, accidents, modification, or shipping, and is void if the instrument is not used in accordance with manufacturer's recommendations or if repaired or serviced by other than Welch Allyn or a Welch Allyn authorized representative.

Please return the instrument registration card for proof of purchase and warranty validation.

Repair

Repair must be performed by authorized factory-trained personnel. Failure to do so invalidates the AudioPath Screener warranty.

Technical Service Department

For customers in North America, please return instruments requiring service to the Welch Allyn Technical Service Department or to an authorized Welch Allyn Service Representative.
Welch Allyn, Inc.
4341 State Street Road
Skaneateles Falls, NY 13154-0220
Attn: Technical Service Department
Telephone: 1-800-535-6663
1-315-685-4560
Fax: 1-315-685-3361

Recalibration

Welch Allyn recommends that the AudioPath Screener be recalibrated annually. You can make arrangements for calibration by contacting Welch Allyn Technical Service Department or an authorized Welch Allyn distributor. A moderate fee is charged for recalibration.

The Printer/Charger Module does not require calibration.

Replacement Parts and Accessories 10

Ordering Information

To order replacement parts or accessories, contact your local Welch Allyn representative or call the Customer Service Department in Skaneateles Falls, NY (USA directly at: 1-800-535-6663 Monday through Friday, 8:00 AM to 5:00 PM Eastern Standard Time.

Screener Parts and Accessories

Table 5 – Screener Parts and Accessories

Item	Description / Comments	Welch Allyn Part Number
Probe Tip	Molded black plastic piece with three metal tubes inside, that locks onto the Probe	29258
Probe Tip Cleaning Kit	Consists of thin cleaning wire and thick cleaning wire	29268
Pod/Probe Assembly	Fully calibrated replacement assembly	29276
Rechargeable Battery	1 each	29270
Charging Transformer	Charges the AudioPath Screener directly from Mains power	Varies by country. See Table 10 on page 73 or call Customer Service.
AudioPath Screener	Single–Patient Model	29210
Carrying Case, Screener	Holds the AudioPath Screener and a box of eartips	29272
Carrying Case, System	Holds the AudioPath Screener and the Printer/ Charger	29274
Quick Check Cavity	Allows functional check of the AudioPath Screener	29234

Printer/Charger Parts and Accessories

Table 6 – Printer/Charger Parts and Accessories

Item	Description / Comments	Welch Allyn Part Number
Thermal Paper	Five rolls of printer paper	29236
Adhesive paper	Five rolls of adhesive printer paper	29240
Printer/Charger	Complete replacement, including two rolls of paper	29220
Videotape VHS (USA)	Videotape VHS (USA)	29278
Videotape PAL (International)	Videotape PAL (International)	29279

Specifications 11

General Specifications

The specifications common to all the major components of the AudioPath Screener System are listed in Table 7. Specifications that apply only to the individual components appear in the section for that component.

Table 7 – General Specifications

	Screener	Printer/Charger	Charging Transformer
Standards	Y2K Compliant UL 2601-1 Part 1: General Requirements for Safety CSA C22.2 No. 601.1-M90 (Canada) CE Mark per Medical Device Directive (93/42/EEC) European Regulatory Manager: Kells RoadNavan, County Meath, Republic of Ireland Tel: 011 353 46 79060 Fax: 011 353 46 27128 EN60601-1:1990 Safety Requirements for Medical Electrical Equipment EN60601-1-2 Medical Electrical Equipment Emissions and Immunity Requirements		
Weight	1.5 lbs (0.68 kg)	With printer and paper: 3.88 lbs (1.76 kg) Without printer and paper: 3.25 lbs (1.48 kg)	See Table 11 on page 74
Dimensions	See *Figure 23, Screener, Pod and Probe Dimensions,* on page 69.	See *Figure 25, Printer/Charger Dimensions,* on page 72.	See *Figure 26, Charging Transformer Dimensions,* on page 74.

Table 7 – General Specifications (Continued)

	Screener	Printer/Charger	Charging Transformer
Electrical	Runs on rechargeable battery (cannot run tests directly from Mains power) Input current: 1000 mA under peak load Input voltage: 7.2 V supplied by battery Battery provides power for testing up to 100 ears over an eight-hour period without recharging	Input voltage: 90-260 VAC Input frequency: 50-60 Hz Input current: 1.0A maximum IEC Mains connector (hospital grade) Charging contacts: output voltage +24 VDC ± 1%	See Table 10 on page 73

Table 7 – General Specifications (Continued)

	Screener	Printer/Charger	Charging Transformer
Electrical (cont'd)	Pod Connector Pin / Function 1 Switched Battery, 6.0 - 8.6 VDC 2 DC Ground 3 Pod Detect, Input, Zin - 10KOhm 4 Start Button, Input, Zin=10Ohm 5 Serial Data, Bidirectional, Zin=10KOhm, Zout=1KOhm 6 Serial Select, Output, Zout=1KOhm 7 Spare 8 Serial Clock, Output, Zout=1KOhm 9 Home, Input, Zin=10KOhm 10 SP1 +, Speaker #1 high side drive, Output, Zout=1KOhm 11 SP1 -, Speaker #1 Low side, (Analog Ground) 12 SP2 +, Speaker #2 high side drive, Output, Zout=1KOhm 13 SP2 -, speaker #2 Low side, (Analog Ground) 14 Pressure, Input, Zin=22KOhm 15 Mic +, Input, Differential, Zin=3KOhm 16 Mic-, Input, Differential, Zin=3KOhm 17 Reserved 18 Reserved 19 Reserved 20 Reserved 21 Shield Ground 22 Unused 23 Unused 24 Unused 25 Unused 26 Unused DIN Connector Pin / Function 1 Charger Voltage Input, Vin=5-25VDC, Iin=400 Ma to 85 Ma 2 Unused 3 AC Ground 4 Foot Switch Input, Zin =10KOhm 5 DC Ground		

Table 7 – General Specifications (Continued)

	Screener	Printer/Charger	Charging Transformer
Operating Temperature	59°F to 95°F (15°C to 35°C), 10% to 90% non-condensing humidity		Thermally protected up to 115°C 1.5A 250V
Storage Temperature	-4°F to 104°F (-20°C to 40°C) 10% to 90% non-condensing humidity		
Storage Altitude	Sea level to 12,000 feet (~3657 meters)		
Communications	Bidirectional communications with Printer/Charger through an infrared link protocol that does not interfere with other IrDA devices	Output voltage: ±8 VDC typical Output impedance: 10MOhm Input voltage: +30 VDC Input impedance: 5KOhm typical Provides communications with the Screener through an infrared link.	----
Operation Time	**Test Time:** Sixty seconds maximum, from time of seal to completion of data acquisition for one ear, without error conditions.	**Print Time:** 10 seconds	----

AudioPath Screener Specifications

This section covers the specifications that apply only to the Screener.

Charging Time

- Ten-hour nominal charge time for completely discharged battery.

Probe Tones and Test Protocol

- The tone generation of this product complies with ANSI S3.6 1996 and IEC 645-1 Standards for Audiometers.
- The Screener contains built-in safeguards that limit the intensity of the test tones to ensure patient safety.

Table 8 – Parameters for Probe Tones and Default Test Protocol

Parameter	Value
Measurable Volumes	0.1 cc to 7 cc ear canal volume
F2/F1 Ratio	1.2
Tone Pairs	2 kHz, 3 kHz, 4 kHz (tone pairs are listed by the F2 frequency) If necessary, the frequency of each tone pair is shifted up by 3/64 octave.
Amplitudes	L1 = 65 dB SPL L2 = 55 dB SPL
DP Levels	-20 to +20 dB SPL (display range)
Sampling Rate	32,000 Hz
FFT Size	512 points

Eartips

- Bio-compatible, latex-free, insert type
- Color coded for size
- Single-use only
- Fit standard, round ear canals of 3.5 to 14 mm diameter
- Two special sizes—E3 and E4—fit irregularly shaped ear canals

Display

- Liquid crystal type with EL back-lighting
- Resolution: 128 x 128 dots
- 1.763 in x 1.763 in (49mm x 49mm) minimum viewing area
- Viewing cone of 60° (maximum)

Dimensions

The United States (Imperial) dimensions appear first, with the metric value in parentheses.

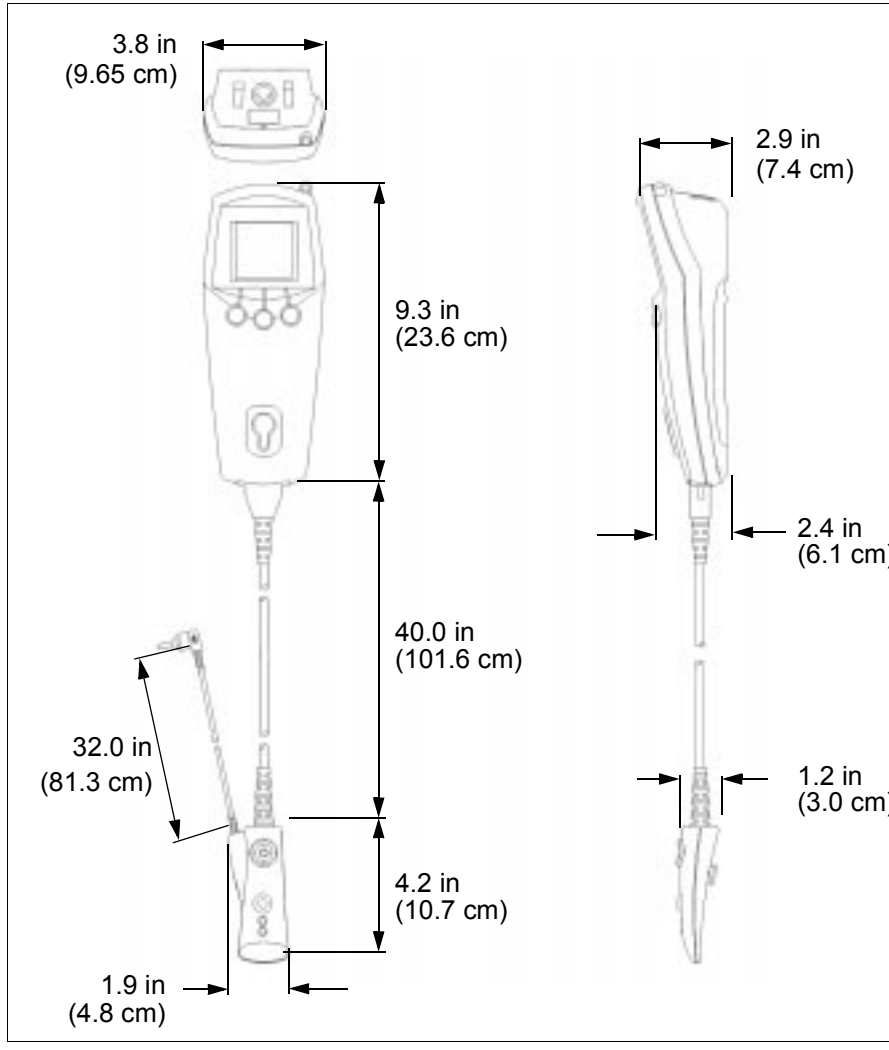


Figure 23 Screener, Pod and Probe Dimensions

DIP Switch Functions

The AudioPath Screener has one 8-position DIP switch that controls the language settings, the Calibration modes, and the Diagnostic mode. The Calibration and Diagnostic mode switches are for Service Technician use only.

The DIP switch is underneath the battery.

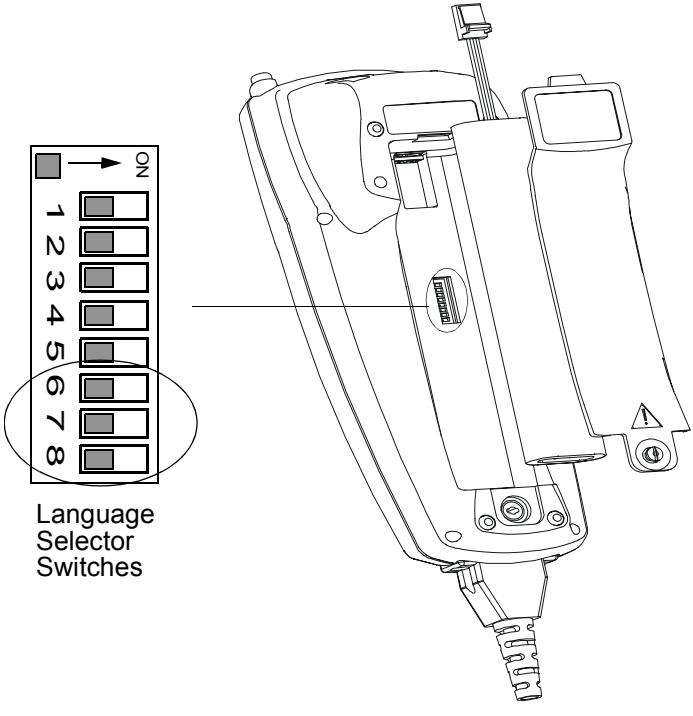


Figure 24 Location and Orientation of DIP Switches

Changing the Language Setting for the Screener

Welch Allyn ships the Screener in one of four languages: English, French, German, and Spanish. However, you can change the language setting if necessary.

Hold the Screener in one hand as you follow the procedure, making sure that you do not press the LEFT or RIGHT buttons. If you hold down a button for four or more seconds, the Screener erases any stored data for that ear.

To change the language setting:

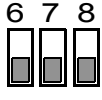
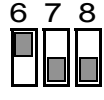
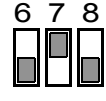
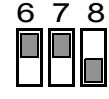
1. Using your thumb or a flathead screwdriver (a thin coin or paper clip will also work), turn the battery cover screw counterclockwise approximately one-half turn.
2. Pull gently on the screw until the cover lifts out. Set the cover aside.
3. Lift up the battery to gain access to the DIP switch.
4. Use a thin non-breakable object such as a straightened paper clip to slide the switches into the positions specified in Table 9 for the language you choose.

Do not use a pencil or pen to move the DIP switches. The pencil lead could break off and fall into the Screener, or ink could leak into the switch or Screener and damage the instrument.

5. Reposition the battery and replace the battery cover.

When you turn the Screener on, it uses the selected language.

Table 9 – DIP Switch Positions for Language Selection

English	French	Spanish	German
			
All OFF	6 ON	7 ON	6 and 7 ON

Printer/Charger Specifications

This section covers the specifications that apply only to the Printer/Charger.

Dimensions

The United States (Imperial) dimensions appear first, with the metric value in parentheses.

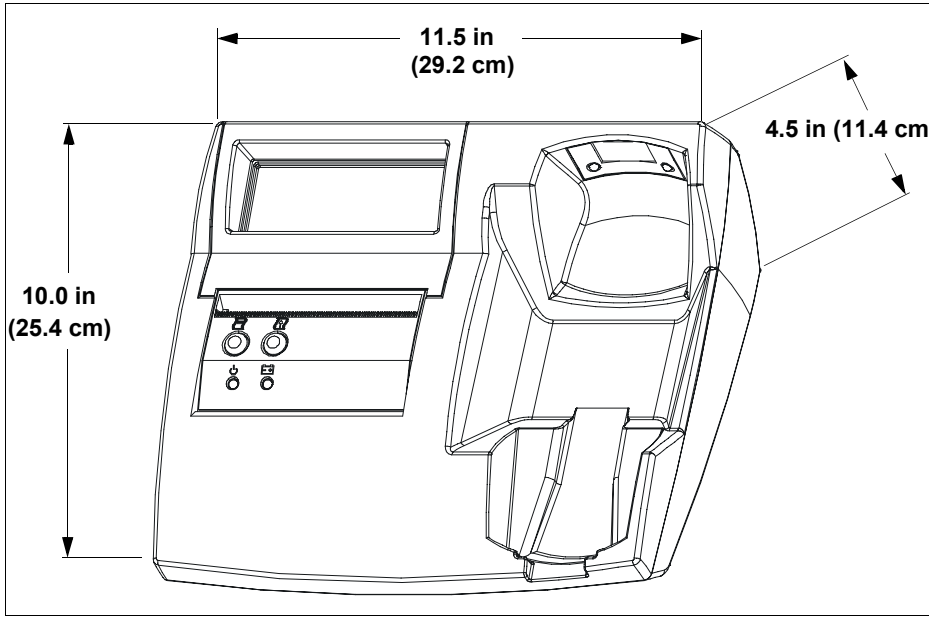


Figure 25 Printer/Charger Dimensions

Plain Paper

- 4.37 in. wide x 82 ft. long (111 mm wide x 25 m long)
- Pink end-of-roll indicator
- Approximate number of printouts per roll: 175

Adhesive-Backed Paper

- 4.37 in. wide x 27 ft. long (111 mm wide x 8.2 m long)
- Approximate number of printouts per roll: 55

Optional Charging Transformer Specifications

This section covers the specifications that apply only to the Charging Transformer.

The Charging Transformer is available in the configurations listed in the table below for most countries' electrical requirements.

Table 10 – Charging Transformer Electrical Specifications

Country	Transformer Part Number	Voltage	Frequency (Hz)
North America	8000-0260	100-120	50-60
Europe (EC Style)	8000-0261	220	50
United Kingdom	8000-0262	240	50
Europe (non-EC Style) and other countries	8000-0250*	220-240	50-60

* Requires country specific power cord

Dimensions

Refer to the following figure and table for the dimensions of the Charging Transformer.

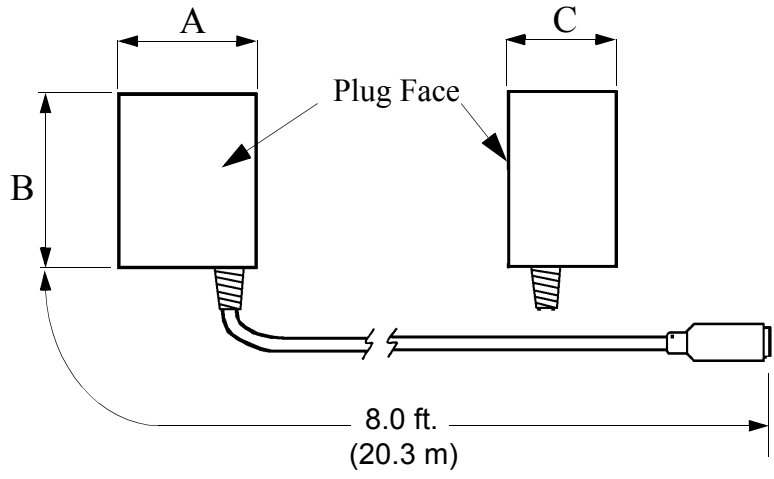


Figure 26 Charging Transformer Dimensions

Table 11 – Charging Transformer Dimensions

Part Number	**A** Inches (cm)	**B** Inches (cm)	**C** Inches (cm)	**Weight** Pounds (kg)
8000-0260	2.20 (5.58)	3.25 (8.25)	1.90 (4.83)	1.12 (0.51)
8000-0261	2.20 (5.58)	3.25 (8.25)	1.90 (4.83)	1.02 (0.46)
8000-0262	2.40 (6.09)	3.30 (8.38)	1.90 (4.83)	1.10 (0.50)
8000-0250	2.10 (5.33)	3.20 (8.38)	1.72 (4.37)	1.18 (0.54)

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